

NOTES ON AUSTRALIAN *TABANIDÆ*.

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The present paper is the outcome of correspondence between the two authors on the question of the identification of specimens of Australian *Tabanidæ*.

One of us (E.W.F.), while in London, had the opportunity of examining the types of Australian *Tabanidæ* in the Natural History Branch of the British Museum, and of comparing specimens with the types. In many instances the identifications were made by Miss Ricardo. Authentically identified specimens of many species were thus available, and these have been compared with such types as are in the collection of the Australian Institute of Tropical Medicine at Townsville.

The correspondence and comparison of specimens have revealed the fact that considerable synonymy exists among recently described species. Some of this is due to misidentification of previously described species, but much is due to too much reliance having been placed on slight variation in characters which can be shown, with long series, to be variable within the one species.

Incidentally it has shown that the groups suggested by Miss Ricardo for the division of the genus *Tabanus* are valueless, at any rate as applied to Australian species. The characters separating groups vii., viii., ix. and x. are entirely superficial, depending solely on clothing, so that the grouping of a species is dependent on the degree of abrasion of the specimen.

While the paper deals mainly with synonymy, one new species has been described, and the descriptions of one or two others have been held up pending the receipt of further material or information.

We should like to acknowledge the help we have received from Dr. Guy A. K. Marshall, Director of the Imperial Bureau of Entomology, in comparing specimens with types in the British Museum.

DEMOPLATUS NIGROVITTATUS, n. sp.

Closely allied to *D. australis* Ricardo, but differing in colouration of the abdomen.

♂. *Face* brown, with yellowish-brown tomentum and rather sparse brown hairs; separated from cheeks by deep groove; cheeks similar; beard white. *Palpi* with second joint long, somewhat club-shaped as in *D. australis*, but black. *Proboscis* comparatively short. *Antennæ* reddish-brown, second joint about half the length of the first; third joint apparently 8-annulate, but annuli somewhat indefinite and hard to distinguish, basal part somewhat wider than rest of joint, first and second joints with long dark hairs. *Eyes* contiguous, moderately finely faceted, bare. *Ocelli* present. *Thorax* dark brown, with brown tomentum and indistinct traces of 3 longitudinal tomentose vittæ, the median darker, the submedian

more yellowish in anterior half, darker posteriorly, the lateral margins with similar yellowish-grey tomentum; pubescence long and fine, greyish in colour, rather scanty, denser posteriorly and above wing roots. Sides dark brown with long, silky, light grey pubescence. *Scutellum* dark brown, with long grey pubescence. *Abdomen* reddish, with a moderately broad, median, black vitta extending the length of the abdomen, and somewhat expanded on first segment; lateral borders with black markings on 3-6 segments; pubescence light brown, with traces of creamy on the segmentations. Venter of a lighter reddish-yellow colour, without any black vitta; with fine greyish pubescence and a fringe of shorter fine creamy pubescence along posterior margin of segments. *Legs* reddish-yellow, tarsi with apical joints infusate; posterior tibial spurs rather short. *Wings* clouded with brown, most marked along the anterior border and along the cross veins; distribution of shading similar to *D. australis*, but darker. *Length*, 11.5 mm.

Hab.—N.S. Wales: Kendall. (Miss M. Henry.)

Described from two males caught on flowers in garden on 26th February and 18th March, 1920. Both specimens have the wings damaged at the tips, and it is uncertain whether the first posterior cell is closed or open; but it is probably open as in *D. australis*. Apart from the colour of the abdomen, which is most striking, the species can be separated by the structure of the 7th tergite. In *D. nigrovittatus* the apical border of this segment is practically truncate, while in *D. australis* the margin is strongly bisinuate, the median portion being produced in a strongly rounded lobe. The antennal annulations are hard to distinguish, in this respect resembling *D. australis*, though the shape of the annulations is slightly different in the two species.

Type in Australian Museum, Sydney.

SILVIUS INDISTINCTUS Ric.

Ricardo, Ann. Mag. Nat. Hist., (8), xvi., (1915), p. 262; *S. hilli*, Taylor, Proc. Linn. Soc. N.S.W., xl., Pt. 4, 1915, p. 806; *S. borealis*, Taylor, *loc. cit.*, p. 809.

Specimens of *S. indistinctus* Ric. were determined by Miss Ricardo, and are unquestionably the same as *S. hilli* Taylor, a series of which has been examined by both authors, and the type by one of us (G.F.H.). Mr. Taylor was probably misled in his identification of *S. indistinctus* (Proc. Linn. Soc. N. S. Wales, 1916, xli., Pt. 4, p. 753) by a specimen so identified by Mr. Austen and quite distinct from the species as identified by Miss Ricardo herself.

The species is a variable one in the colouration of both thorax and abdomen and in the presence or absence of the median abdominal spots.

The type of *S. borealis* has also been examined and, though there appears to be a very slight difference in that the callus is less bulbous, we cannot regard it as other than conspecific with *S. indistinctus* Ric.

SILVIUS NOTATUS Ric.

Ricardo, Ann. Mag. Nat. Hist., (8), xvi., 1915, p. 264; Taylor, Proc. Linn. Soc. N.S. Wales, xli., Pt. 1, 1919, p. 43; *S. psarophanes*, Taylor, *op. cit.*, xlii., Pt. 3, 1917, p. 520; ? *S. fuliginosus*, Taylor, *op. cit.*, xl., Pt. 4, 1915, p. 810.

This appears to be a very widespread species and to a certain extent variable. Among our specimens is one from Sea Lake, Mallee District, Victoria, which was

compared with the type (E.W.F.) from Kalamunda, Western Australia, in the British Museum.

We associate with this specimens from Lake Hattah, Victoria; Narrabri, N.S. Wales; and Springsure and Burnett River, Queensland. The New South Wales and Queensland specimens show some slight difference in that the forehead is slightly narrower and the antennae are rather lighter. The Burnett River specimens (♂, ♀) were bred out by Miss Baueroft and bear a label:—"Bred from larvae found in wet sand at river edge, Burnett R., 18.11.19." They are in excellent preservation, and the abdominal clothing is much more marked than in our other specimens, in which it is somewhat abraded. Through them we were able to associate *Silvius psarophanes* with *S. notatus*; the former species being identified with the Burnett River male. Males and females of *psarophanes* have also been bred out in Townsville (G.F.H.) and correspond with the Springsure and Burnett River specimens.

S. fuliginosus Taylor, of which we have examined the type and compared it with our series of *S. notatus*, appears hardly separable. It is somewhat smaller and the forehead is distinctly narrower than in the Victorian specimens, in which respect the New South Wales and Queensland specimens are intermediate. The antennae and legs are decidedly lighter in colour than in the Victorian specimen, but here again it is linked up by the intermediate specimens. We are inclined to regard it as not being specifically distinct, though it may be necessary to retain the name as a subspecies. Further specimens from the Northern Territory will probably be necessary to settle the status of *S. fuliginosus*.

SILVIUS SORDIDUS Taylor.

Taylor, Proc. Linn. Soc. N.S. Wales, xl., Pt. 4, 1915, p. 808; *S. tabaniformis* Taylor, *loc. cit.*, p. 813.

We have examined the types of Taylor's species and other specimens from the same district (G.F.H.), and cannot find any valid reason for maintaining them as distinct. The type of *S. tabaniformis* has more conspicuous clothing, but the type of *S. sordidus* is certainly considerably abraded. The colour of the abdomen is somewhat lighter in *tabaniformis*, but the type is apparently an immature specimen.

In his description, Taylor states that the inner margins of the eyes in *S. sordidus* are parallel, while under *S. tabaniformis* he states that the inner margins are slightly convergent towards the base. The difference, however, when the two types are compared is inappreciable.

TABANUS LEUCOPTERUS van de Wulp.

Van de Wulp Tijdsch. voor Entom., xi., 1868, p. 98; *T. griseohirtus*, Taylor, Proc. Linn. Soc. N.S. Wales, xli., Pt. 4, 1916, p. 753.

This species was originally described from the Aru Islands, and a specimen in the collection of the South Australian Museum from Stewart River, Queensland, was determined by Miss Ricardo. This has been compared with a series of *T. griseohirtus* Taylor, including the type, and the species are certainly identical. The series shows some variation in size and in the colouration of the clothing, a specimen from Kimberley perhaps representing a variety, but too closely allied to be separated. The species appears to be widespread in the north of Australia and in the islands immediately to the north.

TABANUS PALLIPENNIS Macq.

Macquart, Dipt. Exot., Suppl. 1, 1844, p. 160; Ricardo, Ann. Mag. Nat. Hist., (8), xiv., 1914, p. 397.

A species of *Tabanus* from the Burnett River District, Queensland, bred out from larvae by Miss Baneroff, is tentatively referred to *T. pallipennis*.

Following is a detailed description of the specimens:—

A moderately small species with three well-defined abdominal vittae.

♂. Face rather deeply sunken, black, densely clothed with grey tomentum and with white pubescence; cheeks with grey tomentum and pubescence; beard grey. Palpi with second joint short, oval, creamy yellow, with mixed grey and black pubescence. Antennae brown, the basal joints more greyish; first joint broader and partially concealing second joint, the latter small, somewhat crescentic, both joints with a few, short, black hairs at apices; third joint rather slender, the basal portion ungnate but hardly toothed above. Eyes large, contiguous for greater portion of length, separated below to allow of the appearance of a small strongly nitid black callus; the upper two-thirds of the eyes set with moderately large facets, the lower third with much finer facets.

Thorax black with median, submedian and sublateral grey tomentose stripes, clothed with black erect pubescence and with rather scanty, decumbent, golden pubescence on the grey stripes; sides clothed with grey tomentum, with long, fine, pubescent tufts, mingled dark and grey. Scutellum dark brown with slight reddish tinge, with black pubescence on dorsum and rather scanty, golden hairs along free margin.

Abdomen dark brown to black, with three vittae of elongate, pale grey, somewhat creamy spots, the segmentations also narrowly edged with same colour; median vitta extending from third segment to apex, spots elongate, broader at posterior margins of segments, forming a continuous vitta; sublateral vittae extending from first segment to apex, the vittae more interrupted, the spots not reaching the anterior border of each segment and not triangular in shape; pubescence black, with a few creamy hairs on some of the spots. Venter dark brown, segmentations narrowly edged with grey, pubescence black, grey on segmentations.

Legs dark brown, tibiae lighter yellowish-brown, apical half of fore tibiae darkly infusate, tarsi rather darker than tibiae, the anterior tarsi black; pubescence grey on femora and basal half of anterior tibiae, black elsewhere.

Wings rather dark grey, with whitish areas in centres of cells, only visible from certain directions against a black background, cross veins lightly suffused with brown; veins brown, stigma narrow, fairly conspicuous; appendix present.

♀. Resembles male in general appearance. Face not sunken, densely clothed with greyish tomentum and rather dense, whitish pubescence, cheeks similar, beard white. Palpi with second joint short, very stout, apex not produced but rather sharply pointed, yellowish brown, with short, mixed pale and dark pubescence. Antennae as in male. Forehead rather broad, distinctly wider at vertex than anteriorly, densely clothed with grey tomentum, with brownish tinge in places and darker on vertex, pubescence black in centre and above, shorter and creamy at sides; callus transverse, reaching eyes, black, tumid and shining, a second, round, black callus in centre of forehead, occupying about half the width. Eyes with facets uniform, bare. *Thorax* as in male. *Abdomen* with median vitta extending to first segment, with more distinct, creamy, almost golden pubescence on the

vittae. Venter with fine black pubescence in centre of the segments, grey at the sides. Legs and wings as in male.

Dimensions: ♂. ♀, 12 mm.

Bred from larvae found in wet mud, Cattle Corner, Wingfield (60 miles from Eidsvold), November, 1919 (No. 1).

This species is related to *T. rufinotatus* Bigot, but differs in its broader form, and broader forehead with larger secondary callus, spotted wings, and in its general appearance. This species has been placed under *T. pallipennis* Macq., though it does not completely agree in all details; in Macquart's description there are said to be three calli on the front, the lower two contiguous and sometimes united; in the present specimens there are only two calli, unless the dark area on the vertex be regarded as a third callus, and the middle one is equidistant from the vertex and the lower callus. The wings also differ from the description; in *T. pallipennis* they are described as a little greyish, though the name *pallipennis* would indicate a whitish winged species. Under a lens the wings appear as described above, but in certain lights they appear decidedly pale and the dark spots around the cross-veins are not conspicuous. This pale appearance is more marked in a female recently received from Lake Hattah, Victoria (Nov., 1919—J. E. Dixon). It is possible that *T. pallipennis* Macq. is a distinct species, but until specimens are available agreeing completely with the description it seems preferable to treat these specimens as belonging to Macquart's species.

TABANUS DUPLONOTATUS Ric.

Ricardo, Ann. Mag. Nat. Hist., (8), xiv., 1914, p. 396; *T. parvicallus*, Taylor (*nee* Ricardo), Proc. Linn. Soc. N.S. Wales, xlii., Pt. 3, 1917, p. 524; *ibid.*, Rec. Aust. Mus., xii., No. 5, 1918, p. 64.

This species has been wrongly identified by Taylor; we have specimens compared with the types of both Miss Ricardo's species, and specimens identified by Taylor and recorded above as *T. parvicallus* agree with *T. duplonotatus*.

TABANUS INNOTABILIS Walker.

Walker, List Dipt. Brit. Mus., Part 1, 1848, p. 177; *T. dorsobimaculatus* Macq., Dipt. Exot., suppl. iv., 1850, p. 28; Ricardo, Ann. Mag. Nat. Hist., (8), xv., 1915, p. 273; *T. duplonotatus*, Taylor (*nee* Ricardo), Proc. Linn. Soc. N.S. Wales, xli., Pt. 4, 1916, p. 755.

As the species identified by Taylor as *T. duplonotatus* Ric. did not at all correspond with a specimen compared with the type (E.W.F.), specimens were sent to London (G.F.H.) and have been identified by Dr. G. A. K. Marshall as *T. innotabilis* Walker.

TABANUS APREPES Taylor.

Taylor, Proc. Linn. Soc. N.S. Wales, xlv., Pt. 1, 1919, p. 56; *T. batchelori*, Taylor, *loc. cit.*, p. 58.

The types of the two species have been very carefully compared and we are unable to maintain them as distinct; the principal difference between them is that *T. batchelori* has the wings slightly clouded with brown along the veins, whereas in *T. aprepes* the wings are practically clear. A series from Burnett River, however, shows considerable variation in the amount of suffusion, and varies from specimens in which the wings are more strongly marked than in *T.*

batchelori to specimens in which the wings are clear. There is also considerable variation in the colouration of the abdomen, possibly depending on maturity, as all of the specimens are bred. Both types can be absolutely "matched" among the series.

TABANUS NEOGERMANICUS Ricardo.

Ricardo, Ann. Mag. Nat. Hist., (8), xv., 1915, p. 283; *op. cit.*, (8), xix., 1917, p. 219; *T. hilli* Taylor, Proc. Linn. Soc. N.S. Wales, xlv., Pt. 1, 1919, p. 64; *T. fugitivus*, Taylor, *loc. cit.*, p. 61.

The determination of the above synonymy is based on the comparison by one of us (G.F.H.) of specimens identified by Miss Ricardo as *T. neogermanicus* Ric. with Taylor's types. Taylor has placed his species in two different groups, *fugitivus* in Group ix. and *hilli* in Group x., but the distinction between these two groups is often a matter of abrasion and the groups are not natural ones, in any case, from the description, *hilli* would appear to be wrongly placed in Group x., as the segmentations are described as greyish. A comparison of the two descriptions reveals no difference apart from differences in what might be described as shades of colour. The determination in regard to *fugitivus* was checked by the examination by both of us of a paratype which is absolutely identical with the specimens determined by Miss Ricardo.

TABANUS BREVIOR Walker.

Walker, List Dipt., 1, 1848, p. 188; *T. anellosus*, Summers, Ann. Mag. Nat. Hist., (8), x., 1912, p. 226; Ricardo, Ann. Mag. Nat. Hist., (8), xv., 1915, p. 279; *T. australis*, Taylor, Proc. Linn. Soc. N.S. Wales, xli., Pt. 4, 1916, p. 257; *T. crypserythrus*, Taylor, *op. cit.*, xlv., Pt. 1, 1919, p. 60.

This species has been misidentified in Australian collections. Specimens of *T. australis* sent to London (G.F.H.) have been determined by Dr. G. A. K. Marshall and Mr. E. E. Austen as *T. brevior* Walker. Examination of a short series of specimens of *T. australis* and *T. crypserythrus*, including specimens identified by Taylor, showed that the species were identical. The types of Taylor's two species have also been compared (G.F.H.).

TABANUS NEOPALPIS, nov. nomen.

T. palpalis, Taylor (*nom. praeocc.*), Proc. Linn. Soc. N.S. Wales, xlv., Pt. 1, 1919, p. 66.

The name of this species being preoccupied by an Indian species—*T. palpalis* Ricardo (Records Indian Museum, iv., No. vi., 1911, p. 212)—we propose the above to replace it. The name *T. wilsoni* Taylor, is also preoccupied by *T. wilsonis* Ricardo, but in this instance we understand that the name has already been altered by Mr. Taylor.

TABANUS NIGRIMANUS Walker.

Walker, List Dipt., 1, 1848, p. 183; *T. badius*, Summers, Ann. Mag. Nat. Hist., (8), x., 1912, p. 225; Ricardo, *op. cit.*, (8), xv., 1915, p. 285; ? *T. daphoenus*, Taylor, Proc. Linn. Soc. N.S. Wales, xlv., Pt. 1, 1919, p. 54.

Comparisons of specimens of *T. daphoenus* Taylor with the descriptions of *T. nigrimanus* Walk., and *T. badius* Summers, leaves no doubt in our minds that Taylor's species is the same as Walker's. We have thought it better, however, to

query the identification until a specimen of *T. daphoenus* can be actually compared with the type of *T. nigrimanus*.

TABANUS MINUSCULUS, nov. nomen.

Tabanus minor Taylor (*nec* Macquart), Proc. Linn. Soc. N.S. Wales, xlv., Pt. 1, 1919, p. 64.

A change of name is necessary for Taylor's species, as *T. minor* has already been utilised by Macquart (Dipt. Exot., Suppl. 4, 1850, p. 33) for a species from Patagonia.

TABANUS REGIS-GEORGII Macquart.

Macquart, Dipt. Exot., 1, 1838, p. 132; Ricardo, Ann. Mag. Nat. Hist., (8), xvi., 1915, p. 276; *T. spadix*, Taylor, Proc. Linn. Soc. N.S. Wales, xli., Pt. 4, 1916, p. 761; *T. brisbanensis*, Taylor, *op. cit.*, xliii., Pt. 3, 1917, p. 527; *op. cit.*, xlv., Pt. 1, 1919, p. 67.

We have compared a long series of *T. regis-georgii* with specimens of *T. brisbanensis* Taylor received from the Queensland Museum, and with the type of *T. spadix*, and are unable to discover any tangible differences. The species is a very variable one in the colour of the clothing, in the width of forehead and shape of callus.

The Tasmanian specimens referred by Mr. Taylor to *T. brisbanensis* are evidently the species described by one of us (E.W.F.) as **T. diemenensis*, distinguished by the faceting of the eyes in the male.

For our identification of *T. regis-georgii* we are relying on Miss Ricardo's determination of the species in the British Museum. At the same time it seems unlikely, though not impossible, that the range of our east coast species extends to King George Sound. On the other hand we have seen Victorian specimens. Should the species from King George Sound prove to be different it will be necessary to re-establish the name *T. spadix*.

DASYBASIS APPENDICULATA Macq.

Macquart, Dipt. Exot., Suppl. 2, 1846, p. 25, pl. 1, fig. 1; Walker, List Dipt., Pt. v., Suppl. 1, 1854, p. 267; Ricardo, Ann. Mag. Nat. Hist., (7), xiv., 1904, p. 350.

This does not appear to have been identified in Australian collections of Australian *Tabanidæ* since it was first described, though Bigot has referred a second species from Chili to the genus.

We have specimens before us of a species that agrees fairly well with both generic and specific descriptions with the exception that there are the usual five divisions on the third joint of the antennæ. The divisions are however, obscure and might readily be miscounted, and the base of the third joint is not angulate but somewhat swollen in the middle, corresponding in this respect to Macquart's description.

The species is allied to *Tabanus gentilis* Erichson, and *T. froggatti* Ric., but may be distinguished from both by the head being somewhat compressed antero-posteriorly so that the forehead is relatively shorter and broader than in these species.

Walker's notes on the genus are valueless, as he placed therein two species now referred to *Pelecorrhynchus* and some of the generic characters given by him

*Description sent for publication to the Royal Society of Victoria.

are founded on these. Should our identification prove correct, the genus *Dasybasis* would have to sink as a synonym of *Tabanus*, as the species is too closely allied to *Tabanus froggatti* and *T. gentilis* to admit of separation, and these two latter species are connected by others with the more typical hairy-eyed species of *Tabanus*.

STIBASOMA HEMIPTERA Surcouf.

Bull. Mus. nat. d'Hist. nat., Paris, No. 2, 1912, pp. 62-63.

This species seems to have been quite overlooked by recent workers in Australian *Tabanidae*. The type had the antennae broken when described, which leaves some doubt in our minds as to whether it is ascribed to the correct genus. On the other hand there are other instances where South American genera have been recorded also from Australia.

The description does not fit any species known to us.

